

PETERSEN'S SECOND COMET.

LIVERPOOL.*

Equatoreal.

(Mr. Hartnup.)

1848.	Greenwich M.T.			R.A.	N.P.D.	Corr ⁿ R.A.	Ephem ^s . N.P.D.	Star Comp ⁿ .
	h	m	s					
Dec. 17	5	56	28.9	21 59	59.62	82 7 47.8	-0.94	+ 8.1 a
	6	8	57.6	22 0	1.14	8 24.4	1.20	3.4 a
	6	17	25.4		2.30	8 54.4	1.27	5.4 a
	6	38	10.0		5.28	9 58.6	1.26	0.9 a
	6	47	33.1		6.85	10 32.1	1.05	3.3 a
	7	13	56.3		10.46	11 59.1	1.23	3.0 a, b
	7	30	31.9		12.80	12 52.3	1.20	1.4 a, b
	7	46	56.3		15.16	13 49.9	1.27	4.5 a, b
	19	5	51	59.0	22 6 47.62	84 44 26.1	1.21	3.5 7723 B.A.C.
		5	59	22.9	48.45	44 46.5	1.42	0.0 —
20	7	30	34.1	22 10	22.34	86 6 34.0	0.98	3.0 7827
	7	43	33.1		24.44	7 15.6	0.69	3.4 —
	21	5	49	23.5	22 13 26.73	87 17 7.2	1.03	10.4 7814
	6	2	49.8		28.78	17 52.4	0.23	13.6 7827
	6	18	7.2		30.69	18 37.3	1.01	10.5 7814
22	6	29	10.0		32.30	19 14.5	0.91	13.2 7827
	6	48	27.1		34.58	20 13.1	1.27	11.3 7814
	6	27	51.9	22 16	48.18	88 33 50.1	0.88	17.3 7772
	6	45	1.6		50.18	34 37.5	1.24	11.7 7772, 7838
	7	10	58.6		53.87	35 54.3	1.03	8.6 — —
23	7	11	35.4	22 20	7.64	89 49 28.0	0.99	20.2 7865
	7	23	11.8		9.18	50 4.9	1.00	21.8 —
	28	6	26	14.5	22 35 36.37	95 34 58.1	0.67	22.6 7884
1849.	6	54	19.7		39.85	36 11.1	-0.73	+ 18.0 7986
	6	0	39.8	23 24	46.14	112 6 44.5	...	...
	6	20	15.3		47.79	7 27.1	...	...
	6	36	59.4		49.50	8 3.9	...	...
	6	51	53.0		51.18	8 25.6	...	...
	6	0	39.8		46.14	6 44.5	...	...
	6	20	15.3		47.79	7 27.1	...	...
	6	36	59.4		49.52	8 3.9	...	...
	6	51	53.0		51.18	8 25.6	...	...
	7	4	56.7		52.75	8 41.9	...	...
	7	22	3.0		54.54	9 9.5	...	...
								8155

" The corrections are to be applied algebraically to the ephemeris to represent the observations.

" All the observations, except those of Jan. 15, are made with illuminated wires on a dark field; the powers used were 180 for the first series and 134 for the rest.

" The declinations on Dec. 21, 22, and Jan. 15, are deduced from the readings of the declination circle; on the other days the differences of declination were measured by the micrometer.

" On Jan. 15 the illuminated wires were found to be too bright, and I employed a reticule with thick wires, five for transits and two crossing the field, and cutting each other at an angle for declination. The star of comparison and the comet were

* These observations are given in fuller detail than is usual, to enable astronomers to judge of the probable accuracy of the determinations of the Liverpool observatory, which is now completely furnished and in full activity.

made to pass at the angle thus formed. The assumed mean places of a and b for Jan. 1, 1849, are

$$\begin{array}{ll} a & \text{R.A.} = 21^{\text{h}} 55^{\text{m}} 7\overset{\text{s}}{.}02 \\ b & 22^{\text{h}} 8^{\text{m}} 25\overset{\text{s}}{.}87 \end{array} \quad \begin{array}{ll} \text{N.P.D.} = 82^{\circ} 12' 55\overset{\text{s}}{.}26 \\ 82^{\circ} 12' 17\overset{\text{s}}{.}24 \end{array}$$

as found by one comparison by the equatoreal with 7788, 7833 B.A.C. The other stars are taken from the B.A.C. catalogue.

"In the last six observations of Jan. 11, the comet was so low that the Greenwich Refraction Tables do not apply. I, therefore, computed the refraction from Argelander's supplemental table in the *Tabulæ Regiomontanae*.

"Easterly winds and fog rendered the definition of the comet somewhat vague in general; but on two or three favourable occasions the nucleus appeared stellar; and even through fog and haze the light was sufficiently condensed about the centre to admit of accurate bisection."

HAMBURG.

Equatoreal.

(M. C. Rümker.)

1848.	Hamburg M.T. h m s	R.A. ° ' "	Decl. ° ' "
Nov. 7	16 34 44.4	288 35 33.0	+55 25 16.1
8	16 36 43.4	289 45 55.9	54 38 3.5
14	6 20 3.4	296 13 6.3	49 47 1.2
15	5 57 6.5	297 20 53.3	48 50 9.3
19	5 45 30.9	301 52 55.7	44 43 40.2
20	5 45 16.3	303 0 28.3	43 37 44.8
21	5 52 58.7	304 7 44.4	42 30 5.3
22	7 54 12.9	305 19 38.8	41 15 15.1
23	7 5 13.8	306 23 21.0	40 6 59.6
25	7 29 33.3	308 35 17.5	37 39 43.8
29	6 42 25.0	313 43 26.5	32 26 11.4
Dec. 1	7 5 52.7	314 53 51.4	29 53 28.3
2	6 37 20.6	315 54 3.8	28 33 48.4
3	8 10 53.6	316 58 33.5	27 6 8.9
5	6 57 5.3	318 54 50.3	24 24 16.1
	6 56 35.2	55 15.9	24 24.2
9	6 3 20.4	322 44 52.5	18 52 13.1
10	6 7 52.8	323 41 38.9	17 27 58.3
11	5 30 10.0	324 35 39.5	16 6 41.4
12	6 27 20.2	325 32 48.5	14 35 11.4
13	5 57 21.8	326 26 35.1	13 19 1.4
17	6 23 3.2	329 59 19.6	7 53 4.9
19	9 23 14.7	331 47 55.6	5 6 29.2
20	5 49 37.7	332 30 54.4	+4 0 51.9
24	5 52 15.4	335 45 50.0	-0 55 33.4
28	6 41 3.1	338 53 24.4	5 33 49.5
29	5 53 32.8	339 36 58.6	6 37 38.7
30	6 21 38.4	340 22 20.4	7 42 55.3
1849.			
Jan. 1	7 3 28.2	341 51 0.4	9 49 47.4
2	5 45 8.0	342 32 28.7	10 46 53.9
3	5 44 3.5	343 14 10.5	11 45 55.4
4	6 3 43.0	343 57 1.1	-12 44 40.7

Note.—On Dec. 5, at 6^h 57^m 5.3^s, Hamburg M.T., the nucleus of the comet covered a fixed star, observed by Bessel, zone 323. The star was seen distinctly *through* the comet.

HAMBURG.

(M. C. Rümker.)

1848. Dec. 1	Hamburg M.T. h m s	R.A. ° ' "	No. Obs.	Decl. ° ' "	No. Obs.
	7 33 35.3	20 59 41.80	2	+ 29 52 10.0	1
	7 41 26.1				
5	6 57 35	21 15 39.35		24 24 42.5	
10	6 58 11.8	34 54.45	7	17 24 57.7	7
11	6 13 17.2	21 38 29.73	6	+ 16 4 31.8	6
24	6 53 12.0	22 23 11.97	4	- 0 58 33.1	4
28	7 26 35.3	35 38.75	6	5 35 43.8	6
29	6 57 49.0	22 38 35.67	8	- 6 40 28.7	8

Not corrected for parallax or refraction.

Corrections of Lindenau's Elements of the Orbit of Venus, deduced from the Greenwich Planetary Observations, 1750–1830. By Mr. Hugh Breen, of the Royal Observatory, Greenwich.

In the Greenwich observations from 1750 to 1830 are contained upwards of one thousand observations of *Venus*, and it seems plain that corrections of the elements of her orbit deduced from so extensive a series of observations must be valuable. Impressed with this conviction, the late Mr. Hugh Breen commenced this work, which has been brought to completion by the author with the assistance of his brother, Mr. James Breen, of the Cambridge observatory.

Lindenau's corrected elements of the epoch 1750 were deduced from Bradley's Greenwich observations, 1750–1756. When the places used by him are compared with those given in the Greenwich Planetary Reductions sensible differences are frequently found. In 23 cases out of 78, the difference of R.A. exceeds 5"; and in finding the N.P.D. Lindenau appears to have overlooked the index error of the iron quadrant from 1750–1753, which in some instances amounted to 14".

If the solar tables be supposed to be correct, and the perturbations of *Venus* to be rightly tabulated, any error in the computed place can only arise from errors in the elements of the orbit employed in constructing the tables. In the Greenwich Reductions, the error of geocentric longitude for each mean group of observations is expressed in terms of the errors of heliocentric longitude and radius vector.

By an investigation which the author gives, and which besides is well known, these latter errors may be expressed in terms of the errors of the elements. Since the inclination of the orbit is small, the reduction to the ecliptic may be supposed to be exactly known, and the error of longitude will be nearly independent of the errors of the node and inclination. Hence each mean group of observations furnishes an equation of condition between the errors of the